REFORMER EXERCISE APPARATUS HAVING A TRAPEZE BAR

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of United States Patent application Serial No. 10/723,407, filed November 25, 2003. This application is also a continuation-in-part of United States Patent application Serial No. 10/438,579, filed on May 14, 2003, which is a continuation of United States Patent Application Serial No. 10/035,842, filed on December 24, 2001 which is a continuation-in-part of United States Patent Application Serial No. 09/835,204, filed on April 12, 2001, now US Patent No. 6,527,685, which is a continuation-in-part of United States Patent Application Serial No. 09/521,555, filed on March 9, 2000, now U.S. Patent No. 6,371,895, which is a continuation-in-part of United States Patent Application Serial No. 09/275,755, filed March 25, 1999, now U.S. Patent No. 6,186,929 which is also a continuation-in-part of United States Patent Application Serial No. 09/266,286, filed March 11, 1999, now abandoned, all of which are hereby incorporated by reference in their entirety.

BACKGROUND OF THE INVENTION

Field of the Invention:

This invention relates generally to the field of exercise equipment in which a movable carriage is utilized to at least partially support a user's body, commonly referred to as a "reformer", and more particularly to a reformer that incorporates a trapeze frame.

Description of the Related Art:

Joseph H. Pilates, in U.S. Pat. No. 1,621,477, originally developed the concept of using a wheeled platform carriage connected to a resistance device such as a set of weights in conjunction with a stationary frame to provide a variable resistance against which a user could push with his/her feet or pull

with the arms while in a sitting or recumbent position in order to exercise the major muscle groups of the user's trunk, legs and/or arms. Since that time Joseph Pilates developed many changes and improvements in the design of such an apparatus, and more recently, have been evolved by his students and others. U. S. Pat. No. 5,066,005 and my patents referred to above are representative of the current state of evolutionary development of these changes that have taken place since 1927.

The current reformer type exercise apparatus includes a wheeled platform carriage, which rides on a generally rectangular wooden or metal frame. The above referenced patent discloses examples of wood framed reformers. An example of a metal frame reformer is disclosed in U.S. Patent No. 5,792,033 to Merrithew. The carriage, which rides on the frame, is connected to a series of parallel springs or elastic members, which are in turn connected to a foot end of the rectangular frame. The carriage rides on parallel rails or tracks typically mounted to the inside of or incorporated into the longer sides of the rectangular frame. This carriage has a flat, padded upper surface and typically includes a pair of spaced, padded, upright shoulder stops and a headrest at one end to support the shoulders and head of the user when he/she is reclined on the carriage. An adjustable foot bar, foot support, or footrest against which the user places his/her feet is mounted to the foot end of the rectangular frame. The user can then push against the footrest to move the carriage along the track away from the footrest against spring tension to exercise the leg and foot muscle groups in accordance with prescribed movement routines. U. S. Patent Nos. 5,338,276, 5,607,381 and 5,681,249 disclose reformers and several footrest arrangements and adjustable headrest assemblies for this type of exercise apparatus.

There are a number of exercises that are best performed on what is conventionally known as a "trap table". A trap table is of similar size as a reformer, having a rectangular frame and a cushioned rectangular upper surface, raised about three feet off a supporting floor for a user to either sit or

lie on. A vertical support bar is fastened to each corner of the frame. Each bar extends about four feet above the frame and a horizontal rectangular tubular frame joins the upper ends of each of the support bars to form a rigid structure. Attachments to these bars, such as springs, padded handles and a trapeze swing bar permit a variety of exercises to be performed by a user that could not otherwise be performed on a reformer. The trap table is large, providing a platform about three feet above a supporting floor, with the tubular frame extending four to five feet above the user surface. One of the drawbacks, however, of the trap table is its size. Thus there is a need for a reformer type of exercise apparatus that can be efficiently stored which also has the capabilities for the user to perform exercises that could heretofore only have been practiced on a trap table.

SUMMARY OF THE INVENTION

The reformer exercise apparatus in accordance with the present invention addresses the above-identified drawbacks in reformer designs. The present invention is a reformer exercise apparatus that includes a collapsible trapeze frame at one end of the generally rectangular reformer frame. In a preferred embodiment, the collapsible trapeze frame is also removably fastened to the reformer frame. In another embodiment, the collapsible trapeze frame may alternatively be adjustably positioned at different operational locations along the length of the reformer frame.

The frame of a reformer in accordance with the present invention has a pair of spaced parallel side rail members spaced in parallel relation by a foot end support member and a head end support member and incorporates a pair of elongated extrusion members in the side rail members. These elongated extrusion members form an outwardly open T shaped slot running along the length of each parallel side of the frame. A trapeze assembly in accordance with the present invention is slidably mounted in the T shaped slots, and preferably located at the head end of the frame.

The reformer includes a wheeled carriage that is movably mounted on the parallel track members of the generally rectangular frame. The carriage has a pair of upwardly extending shoulder stops mounted thereto at one end and a headrest between the shoulder stops that extends outward from the carriage toward the head end of the frame. A plurality of elastic members may be selectively connected between the foot end of the frame and the carriage to elastically bias the carriage toward the foot end of the frame.

The trapeze assembly includes an upside down, generally U shaped arched frame having a spaced pair of parallel legs. Each leg is removably received in a T slot clamp bracket assembly that fastens the leg in the T slot. The U shaped trapeze frame may be pivoted in the bracket assemblies to a folded position so as to lie generally along the top of the reformer frame for compact storage, and rotated in the bracket assemblies to a substantially vertical operating position for use. The trapeze assembly includes at least one trapeze bar suspended by trapeze arms from the trapeze frame, and includes arm cord pulleys mounted in longitudinal slots in the trapeze frame legs, thus eliminating a need for separate arm cord pulley supports generally provided in the reformer exercise apparatus.

Other objects, features and advantages of the present invention will become apparent from a reading of the following detailed description when taken in conjunction with the accompanying drawing wherein a particular embodiment of the invention is disclosed as an illustrative example.

BRIEF DESCRIPTION OF THE DRAWING

Fig. **1** is an upper perspective view of a first embodiment of the reformer exercise apparatus in accordance with the present invention with the carriage shown in a partially tensioned position away from the spring anchor assembly at the foot end of the frame and the trapeze assembly spaced from the frame rails, with the trapeze assembly shown in an operating position.

Fig. **2** is an upper perspective view of the reformer exercise apparatus shown in Fig. **1** with the trapeze assembly installed on the frame rails.

Fig. **3** is an upper perspective view of the reformer exercise apparatus as in Fig. **2** with the trapeze assembly in a storage position.

Fig. **4** is an alternative reformer apparatus in accordance with the invention with a trapeze assembly shown positioned for installation on the T slots in the frame rails.

Fig. **5** is an assembled perspective view of the reformer apparatus shown in Fig. **4**.

Fig. **6** is an enlarged partial view of trapeze assembly bracket assembly at the head end of the reformer shown in Figs **1** and **2** with the trapeze frame oriented upright, and in a storage position shown in dashed lines.

Fig. **7** is an exploded perspective view of the trapeze assembly bracket assembly shown in Fig. **6**.

DETAILED DESCRIPTION OF THE INVENTION

An exercise apparatus **100** in accordance with a first embodiment of the present invention is shown in upper and lower perspective views in Figures **1** and **2** respectively. The exercise apparatus **100** comprises a generally rectangular frame **102** having a head end **104** and a foot end **106** and a pair of parallel track or rail members **108** separating the head end **104** from the foot end **106**. Each of the rail members **108** has an outwardly open T shaped slot **110** running the length of the rail member **108**.

A movable carriage **111** rides on four roller/guide wheel assemblies **112**, one of which can barely be seen in Fig. **1**, fastened to the underside of the carriage **111**. These wheel assemblies **112** roll on the track members **108** to support and guide movement of the carriage **111** back and forth along the

track members **108** of the frame **102**. A plurality of elastic members, e.g., springs **114** are selectively connected between the carriage **111** and the foot end **106** to bias the carriage **111** toward the foot end **106**.

A foot bar assembly **116** is removably fastened to the frame **102** near the foot end 16 so as to provide a stationary support for a user to push against in order to move the carriage **111** back and forth along the track members **108**. The foot end **106** also includes a flat foot platform **118** for a user to place one foot on while the other foot is placed on the carriage **111** for standing exercises on the apparatus **100**.

The head end **104** is designed to space the rail members **108** rigidly apart. The head end **104** is preferably a rectangular box tubular extrusion member made preferably of aluminum permanently fastened to the head ends of the rail members **108**. The carriage **111** comprises a flat support platform **120** which has a generally rectangular shape. A cushion pad **122** is secured to an upper surface of the platform **120**. A pair of shoulder stops **124** are spaced apart near one end of and fastened to the rectangular platform **120**. These shoulder stops **124** engage with a user's shoulders when the user lies on his or her back on the carriage **111** while exercising on the apparatus **100**. A padded headrest **126** is fastened via a hinge at a base end to the platform **120** between the shoulder stops **124.**

A trapeze assembly **130** in accordance with the present invention is slidably installed in the T shaped slots **110** in the rails **108**. The trapeze assembly **130** includes an upside down U shaped or arched frame **132** that has two parallel legs **134** joined by a U shaped upper section **136**, typically has a trapeze bar **138** suspended from the legs **134,** and has a pair of support bracket assemblies **140** that slide into the T shaped slots **110** in the rails **108**. These support bracket assemblies **140** permit the trapeze frame to be rigidly positioned in an upright operating position as shown in Figure **2** and in a

collapsed, storage position generally parallel to and on top of the frame **102** as shown in Figure **3**.

An alternative reformer with trapeze assembly in accordance with the present invention is shown in Figures **4** and **5**. In this embodiment, the reformer **200** again has a pair of parallel side rails **202** separated by a head end **204** and a foot end **206**. A foot bar assembly **208**, similar to the foot bar assembly **116**, is fastened to the foot end of each of the side rails **202** in T shaped slots **210** that run the full length of the side rails **202** of the reformer frame. A trapeze assembly **230** is slidably disposed in the T shaped slots **210** in a similar manner to that described above with reference to the first embodiment **130**. However, in this embodiment, the trapeze assembly **230** may be selectively positioned virtually anywhere along the length of the reformer frame.

The T shaped slots **210** have spaced holes **212** that also run the full length of the side rails **202**. These holes **212** permit the foot bar assembly **208** to be selectively locked in the holes **212** to position the foot bar assembly **212** at virtually any position along the reformer frame. Similarly, the support brackets of the trapeze assembly **230** can be positioned at virtually any position along the length of the slots **210**, and indexed to positions corresponding to the holes **212**. This feature permits a number of exercises to be performed that were heretofore not possible.

An assembled view of the reformer **200** with the trapeze assembly **230** installed at the head end **204** is shown in Figure **5**. In addition, a pair of arm cords **214** is shown installed on the pulleys **216** that depend from a pair of pulley anchor posts **218** as will be more fully described with reference to Figure **7** below. Note that the anchor posts **218** may be adjustably raised or lowered in slots in the legs of the frame of the trapeze assembly **230**.

The trapeze assembly **230** includes an upside down U shaped or arched frame **232** that has two parallel legs **234** joined by a U shaped upper section

236, typically has a trapeze bar 238 suspended from the legs 234 and has a pair of support bracket assemblies 240 that slide into the T shaped slots 210 in the rails 202. These support bracket assemblies 240 permit the trapeze frame 232, as in the first embodiment, to be rigidly positioned in an upright operating position as shown in Figures 4 and 5 and in a collapsed, storage position generally parallel to and on top of the frame rails 202 as shown in Figure 3. The frame 232 also carries a series of spaced eyebolts 239 for anchoring ends of a variety of elastic members such as springs 114 to the frame 232. The other ends of the springs 114 may be fastened to the trapeze bar 238 or, for example, connected to a handgrip and stretched and retracted by a user.

In this embodiment shown in Figures 5 and 6, the support bracket assembly 240 is the same as that described below with reference to Figures 6 and 7, except that the assembly 240 also includes a spring loaded pin/knob 242 that extends through the assembly 240 into one of the holes 212 in the T shaped slots 210. This spring loaded pin 242 permits the indexing of the trapeze assembly 230 along the rails 202. The user simply withdraws each of the pins 242 to permit the assembly to be slid to a different position along the T shaped slots 210. When the pin 242 is released, the bracket 240 is locked in a predetermined position on the frame 202. The assembly 240 is then securely fastened into position as described below.

Turning now to Figures 6 and 7, a detailed description of the bracket assembly 140 is provided. It is to be understood that this description applies similarly to the support bracket assembly 240 shown in Figures 4 and 5 except for the addition of the spring loaded pin 242, which is not shown in Figures 6 and 7. An enlarged view of the bracket assembly 140 installed on frame 102 and supporting one leg 134 of the trapeze frame 132 is shown in Figure 6. The leg 134 of the trapeze frame 132 is shown in a storage position in phantom lines as well. An exploded view of the bracket assembly 140 is provided in Figure 7.

The bracket assembly **140** basically includes an elongated inner plate 142, a spacer tube **144**, an outer bracket plate **146**, and a pair of upper and lower clamping bolts **148** and **150**. In the preferred embodiment shown, the assembly **140** also includes a spacer plate **152** and an elongated pivot washer plate **154**. The spacer plate **152** is sized to center the inner plate 142 in the T shaped slot **110**. Each of the clamping bolts **148** and **150** has a hand knob **156** permanently attached to one end of the bolt.

The inner plate **142** is an elongated, generally rectangular plate with a raised rectangular clamp portion **158** at one end thereof. The cross sectional shape of the inner plate **142** is complementary to the T shaped slot **110** in the frame **102** so that the inner plate **142** can be slipped into the T shaped slot **110** and slidably moved to various positions within the slot **110**. The rectangular clamp portion **158** is sized so that its face projects slightly out of and parallel to the slot **110**. The square spacer tube **144** and the spacer plate **152** are sized to fit onto the inner plate **142** adjacent the clamp portion **158**. A pair of flat head bolts **160** extend through the inner plate **142**, the spacer plate **152**, and into the spacer tube **144**. These bolts secure the inner plate, the spacer plate **152** and the spacer tube **144** together as a unit, with conventional nuts, not shown. The outer plate **146** is in turn fastened to the inner plate **142** through the spacer tube **144** and spacer plate **152** with four hex head bolts **162**. When these bolts **162** are threaded into the inner plate **142** and tightened, the assembly of these four components becomes a rigid unit.

The height of the inner plate **142** is chosen so that its upper edge can be slipped under the upper edge of the slot **110** in the reformer **100** to permit the plate to be rotated so that the lower edge enters into the slot **110**, when the assembly is loosely assembled with the flat head bolts **160**. When the inner plate **142** is fully positioned in the slot **110**, the assembly of the inner plate **142**, the spacer plate **152**, and spacer tube **144** can be tightened together via bolts **160**. This action causes the spacer plate **152** to center the inner plate **142** in the slot **110** such that the assembly of plates and spacer tube cannot be

removed from the slot **110**. However, in the reformer **200** shown in Figures **4** and **5**, the fully assembled and tightened assembly (**140**) **240** may be simply slid into the end of the T shaped slot **210**.

In the embodiment **140** shown in Figure **7**, the elongated pivot washer plate **154** is fastened to the outer plate **146** with three screws **164**. These screws form a rigid connection between the outer plate **146** and the washer plate **154**. Washer plate **154** has an upper threaded hole **166** that aligns with bore **168** through the outer plate **146**. This hole **166** receives the distal end of the bolt **150**. The bore **168** acts as a clearance passage for the end of the bolt **150**.

Each of the frame legs **134** is a square tube. The lower end of each of the trapeze frame legs **134** has a pair of open slots **170** in opposite sides of the square tube end. A first pair of closed slots **172** in the same opposite sides of the square tube frame legs **134** is spaced from the slots **170**. A second pair of closed slots **174** is spaced axially from the first pair of closed slots **172**. The upper clamp bolt **150** passes through a spacer **182** and through the lower closed slots **172,** threads into the threaded hole **166** in the washer plate **154**, and extends partially into the bore **168** when tightened to fasten the leg **134** to the upper end of the bracket plate **146**. The lower bolt **148** passes through the outer plate **146**, a through bore in the washer plate, through the open slots **170** and into a threaded bore **176** in the clamp portion **158** of the inner plate **142**. When the bolt **148** is tightened, the lower end of the leg **134** is tightly clamped between the washer plate **154** and the clamp portion of the inner plate **142**. At the same time, the inner plate **142** is drawn outward toward the outer plate 146 to claim the bracket assembly **140** tightly in the slot **110**.

The upper pair of slots **174** accommodates a pulley support arm bolt **178** that extends through the slots **174** and through the leg **134** into a threaded support post **180**. A pulley eyebolt **218** threads into the opposite end of the threaded support post **180**. The eyebolt **218** is in turn fastened to a pulley

216 as shown in Figures **1-5**. By loosening the bolt **178**, the pulley **216** may be adjusted up and down within the slot **174** to a position preferred by a user of the apparatus in accordance with the invention.

Other configurations of clamping members are also envisioned by the present invention. The structure of the particular embodiments **140** and **240** described above is simply one way of fastening the lower ends of the legs **134** to the T shaped slots in the rails of a reformer exercise apparatus **100**. For example, a cam locking structure with a set of counteracting cams to engage the sides of the slots **110** may be utilized and may be applied in the slots **110** to securely fasten the legs **134** to the frame **102**. Another example would be a set of sliding wedge members that slide to expand against the walls of the slot **110**.

Accordingly, the invention may be practiced other than as specifically described and shown herein with reference to the illustrated embodiments. The present invention is not intended to be limited to the particular embodiments illustrated but is intended to cover all such alternatives, modifications, and equivalents as may be included by the following claims. All patents, patent applications, and printed publications referred to herein are hereby incorporated by reference in their entirety.